Watercraft Electrical Safety Requirements, Policies, and Instructions (2014)

Background: The checklists in this watercraft section (Appendices C-1 through C-5) were developed to assist in the design of watercraft from an electrical safety perspective. Electrical safety information for watercraft and ships is found in several documents, listed below. These documents are routinely updated; therefore, it is important that the user verifies that they are using the most current version of the document at the time of use.

1) The Naval Ships Technical Manual (NSTM) provides technical information to personnel engaged in the supervision, operation, or maintenance of Navy ships. The chapters and volumes of the NSTM contain detailed administrative and technical instructions that amplify Navy regulations and other authoritative documents. These instructions are designed to assist afloat personnel in the management of ships and shipboard machinery and equipment in order to achieve optimum performance (not necessarily "safety") throughout each ship's life cycle and to ensure readiness for all assigned missions.

2) Precautions for electrical hazards are addressed in OPNAVINST 5100.19 (series). Navy Safety and Health Program Manual for Forces Afloat, Chapter B-7.

3) NFPA 70E, *Standard for Electrical Safety in the Workplace* is the benchmark for electrical safety. Although NFPA 70E does not cover safety related practices for watercraft and was developed for land-based systems, Informative Annex O includes guidance for safety related design requirements that enhances electrical safety, such as (a) zone-selective interlocking; (b) differential relaying; and (c) energy-reducing maintenance switching with a local status indicator.

4) The Institute of Electrical and Electronics Engineers (IEEE) has developed a standard for safety considerations in ships, IEEE 45.5 - 2014, *Recommended Practice for Electrical Installations on Shipboard -- Safety Considerations*. This standard covers electrical safety considerations for shipboard electrical systems and equipment including a review of fundamental concepts pertaining to electrical safety and establishing electrical safety programs and work practices associated with the operation and maintenance of shipboard electrical power distribution systems.

The following table lists the existing watercraft lockout requirements for Army, Navy, and Coast Guard.

Watercraft Lockout Requirements for Army, Navy,and Coast Guard (2014)				
Entity	**Policy Instruction**	**Purpose**	**Application**	**Program Contents**
Army	Army Watercraft Safety, FM 4-01.502 (FM 55-502) May 2008	Provides guidance and technical information relevant to safety and survival systems used by US Army watercraft.	Army personnel engaged in the supervision, operation, or maintenance of US Army watercraft. FM 55-502, 6-57: "The use of tags or other labels is not a substitute for other safety measures such as chaining or locking valves."	Chapter 6, starting at 6-56 contains a section on the control of hazardous energy sources. http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/fm4_01x502.pdf
Coast Guard (Department of Homeland Security)	33 CFR 150.615 requires compliance with 29 CFR 1910.147, and 150.616 are requirements for lockout Note: Coast Guard follows OSHA 29 CFR 1910.147 requirements; or 29 CFR 1910.331-1910.335 for the control of hazardous electrical energy: In the shipyard and the shipyard has control of the vessel, 29 CFR 1915.89, "Control of hazardous energy (lockout/tags-plus") apply.	1910.147 compliance is required for the control of hazardous mechanical energy, e.g., moving parts, rotating shafts, and equipment subject to falling due to gravity. The provisions of 1910.333 covers safety-related work practices to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits which are or may be energized.	All Coast Guard and contractor personnel. "Live parts to which an employee may be exposed shall be de-energized before the employee works on or near them, unless the employer can demonstrate that de-energizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs."	Refer to 1910.333(c) for working on or near exposed energized parts. Refer to Base Los Angeles Long Beach Instruction 5100.48: http://www.uscg.mil/baseLALB/Instructions/BASELALBINST_5100.48_-_CONTROL_OF_HAZARDOUS_ENERGY_(LOCKOUT-TAGOUT)_PROGRAM.pdf

Watercraft Lockout Requirements for Army, Navy,and Coast Guard (2014)				
Entity	**Policy Instruction**	**Purpose**	**Application**	**Program Contents**
Military Sealift Fleet Support Command (MSC)	MSC Safety Management Procedures Manual, 2.1-004-ALL Lockout/Tagout (LO/TO) program, 8 July 2009	Establishes procedures for locking out and/or tagging out equipment, machinery, or systems to safeguard workers from the unexpected energizing or release of stored energy.	All Civil Service Mariners (CIVMARS) and Military Personnel on all USNS and USS vessels shall follow this procedure except: Military personnel aboard the AS-Class Submarine Tenders in the NSF and aboard USS MOUNT WHITNEY (LCC-Class) in the communication spaces shall maintain a separate Navy tagout program to include a tagout log and follow Navy Tag Out procedures; Embarked sponsors on the T-ARC and T-AGM Class may have a separate LO / TO program to ONLY work on their equipment.	Work methods and procedures required for all installation, maintenance, repair, alteration, or service performed on shipboard equipment, machinery or systems. Requires identification of systems requiring lockout of machinery or systems routinely serviced at or near its energy source. NOTE: LO/TO of ship equipment and systems under the control of MSC, for work to be accomplished by contractors, is the responsibility of MSC. Not available via internet.
Navy – CNO (OPNAV)	OPNAVINST 5100.19E, 30 May 2007	Occupational Safety and Health Program Manual for Forces Afloat	Primary afloat safety reference and provides specific guidance for implementing NAVOSH Program elements unique to an afloat environment.	Complete safety manual including multiple chapters for mishap prevention, Volume III, Chapter D5 is electrical and electronic safety and tagout precautions. "Tagging out of electrical or electronic energy sources shall be conducted in accordance with NAVSEA S0400-AD-URM-010, Tag-Out Users Manual (TUM)" http://doni.daps.dla.mil/Directives/05000%20General%20Management%20Security%20and%20Safety%20Services/05-100%20Safety%20and%20Occupational%20Health%20Services/5100.19E%20-%20Volume%20I%20Part%20I.pdf

Watercraft Lockout Requirements for Army, Navy,and Coast Guard (2014)				
Entity	**Policy Instruction**	**Purpose**	**Application**	**Program Contents**
Navy Diving and Salvage Training Center, (NAVDIVESALVTRACEN)	NAVDIVESALVTRACEN INSTRUCTION 5101.1E, Equipment Lockout/Tagout Procedures, 11 January 2001	Establishes NAVDIVESALTRACEN policy and minimum procedures for locking out and/or tagging out the sources of energy to equipment or systems under the requirements OPNAVINST 5100.23G, Chapter 24, Energy Control Program, Lockout/Tag out, and OPNAVINST 3120.32, Section 630.17, Equipment Lockout/Tagout procedures are described for lockout, or when locking devices are not feasible.	All NAVDIVESALTRACEN personnel	Specific procedures are described for lockout, or when locking devices are not feasible. Lockout procedures shall be used for all corrective and preventive maintenance including work done by repair activities or contractors. Unavailable to public.
Naval Sea System Command (NAVSEA)	Tagout Users Manual, 5 November 2009 with changes from 24 October 2011 “Advance Change Notice”	Provides standard tag-out procedures for control of hazardous energy when a component, equipment, system or portion of a ship’s system is isolated or in an abnormal condition; prevent improper operation when a freeze seal is applied to a system or when other safety devices such as blank flanges are installed for testing, maintenance, or casualty isolation; and provide a procedure for use when an instrument is unreliable or not in its normal operating condition.	Navy over-arching afloat policy for controlling hazardous energy. Requirements of this manual apply to equipment tag-outs and instrument labels on all systems and components on naval ships and craft when manned by Ship’s Force.	NAVSEA tagout policy. Requirements apply to equipment tag-outs and labels on all systems and components on naval ships and craft when manned by Ship’s Force. Web link for policy. http://www.navsea.navy.mil/Organization/NAVSEA%20Instructions.aspx

NOTES:

1) On May 2, 2011, the Occupational Safety and Health Administration (OSHA) published Subpart F of 29 CFR 1915 (General working conditions in shipyard employment), which included section 1915.89, Control of hazardous energy (lockout/tags-plus) for shipyards. NAVSEA Tagout Users Manual was revised in 2011 to reflect the new OSHA shipyard Lockout/Tags plus requirements. The OSHA maritime rule contains several notes that allow certain exceptions from §1915.89 when shipyard employees service vessels owned and operated by the U.S. Navy. For any servicing operations performed solely by uniformed military personnel, OSHA does not have jurisdiction. The U.S. Navy is responsible for ensuring protection of its uniformed military personnel.
2) NAVSEA 04R, Occupational Safety and Health Office has published guidance for LO/Tags plus, NAVSEA Occupational Safety, Health and Environment Manual for Naval Shipyards available at: http://www.navsea.navy.mil/shipyards/norfolk/Shared%20Documents/Chapter%20250.pdf. This Manual provides hazardous energy controls for employees when servicing machinery, equipment, or systems that employees use in the course of shipyard employment work conducted a) in any landside facility that performs shipyard employment work; and b) on any vessel or vessel section.
3) When tags are used for the control of hazardous energy, an additional safety measure is required to provide as much protection as that received by using a lock. The additional safety measure is a component of the “tags-plus” system that provides an impediment (in addition to the energy isolating device) to the release of energy or the energization or start-up of the machinery, equipment, or system being serviced. Examples of additional safety measures include, but are not limited to, removing an isolating circuit element; blocking a controlling switch; blocking, blanking, or bleeding lines; removing a valve handle or wiring it in place; and opening or guarding an extra disconnecting device.
4) On shore, tagout alone is not acceptable unless energy control devices (switches, valves, etc.) will not accept a lock or lockout device.
5) OSHA and Coast Guard require energy control devices on equipment WHENEVER the equipment or control devices are replaced.